

Energy & Materials Flow & Cost Tracker (EMFACT)

Terri Goldberg
Northeast Waste
Management
Officials' Association

N E W M O A



Overview

- Background
- Purpose & Scope
- Development Process
- Big Picture
- Example
- Features
- Status

EMFACT Objectives

To assist small & medium-sized businesses in the U.S. to:

- Better track & understand the use & flow of fuel, water, & materials through their facility
- Better understand the actual costs of poor resource efficiency & subsequent waste management
- Improved business decision-making & environmental performance
- Implement a cycle of continuous improvement via continuous tracking

EMFACT Products

- An **easy-to-use, well-documented tool** to assist small & medium-sized enterprises in tracking:
 - ♦ fuel, water, & materials use
 - ♦ generation of air emissions, wastewater, & solid/hazardous waste
 - ♦ associated costs
- **User's guidance & training materials**
- Training for **technical assistance providers**
- Online **downloadable free access** to the software application & support materials

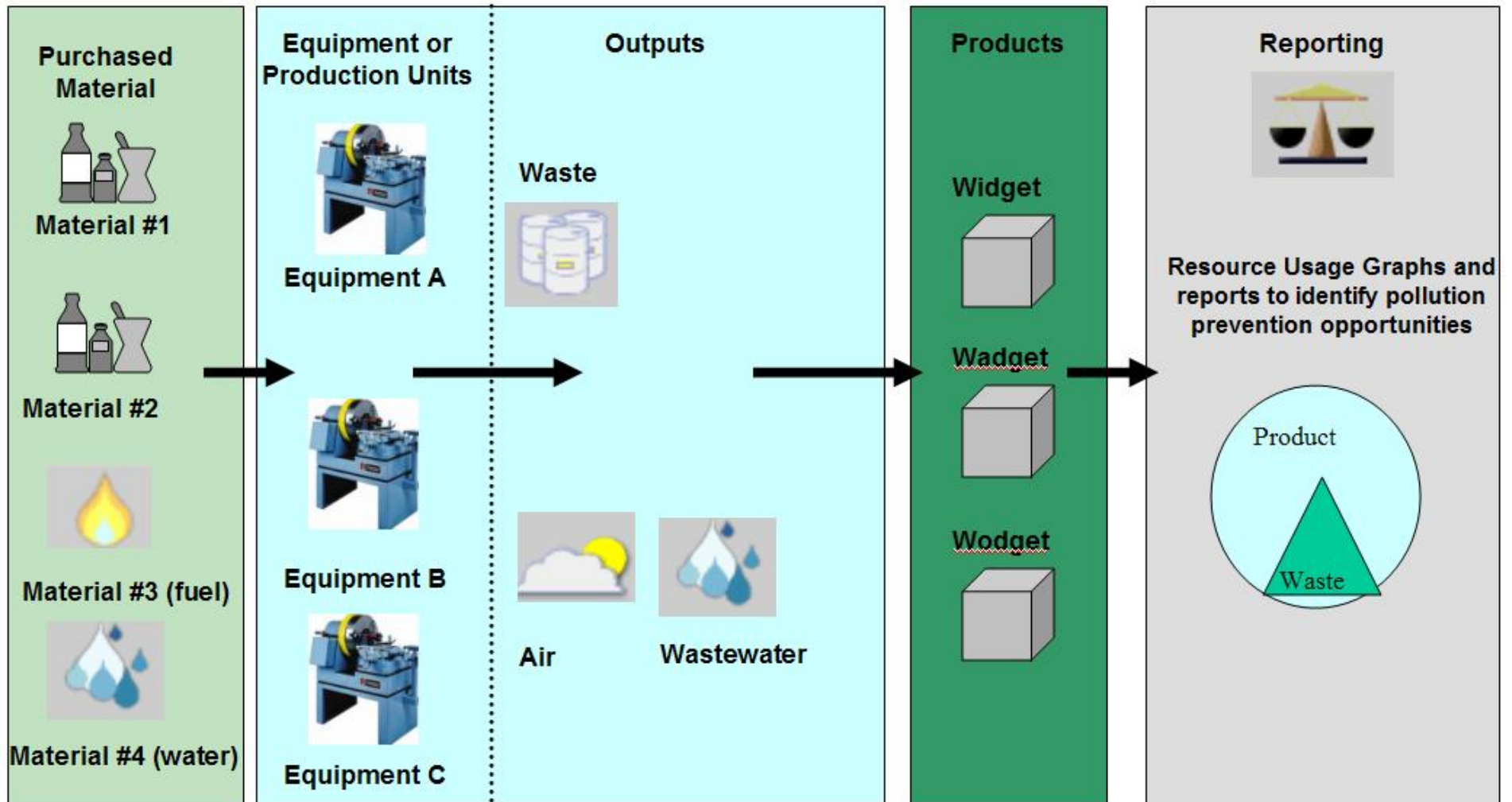
EMFACT Team

- US EPA (*funder*)
- Northwest Waste Management Officials' Association (NEWMOA)
- Massachusetts Office of Technical Assistance (Mass OTA)
- SYS Technologies
- EMARIC
- Advisory Group (includes EPA)

Development Process

- Engaged Advisory Committee, TURPAs, example companies, & NEWMOA's Board
- Developed a Draft Request for Proposals (RFP)
- Held a vendors' meeting – Comments on Draft
- Issued final RFP – Held bidder's conference
- 5 proposals submitted
- Formed review committee
- Selected SYS Technologies
- Developed contract
- Developed systems & data requirements

Data Flow




EMFACT Approach

- User has the option to **define**:
 - ♦ Organization (e.g., departments)
 - ♦ Site & buildings
 - ♦ Equipment, including waste management equipment
 - ♦ Inputs (fuel, water, materials, chemical constituents)
 - ♦ Intermediate & final products
 - ♦ Non-product outputs (air, water, waste)
- **Link** the components together
- Populate with **data**, e.g., physical quantities, costs, emission factors
- Analyze & **report**

EMFACT Dashboard

EMFACT Start Page


 **EMFACT** Energy & Materials Flow and Cost Tracker

Setup

- ToolBox Admin
- EHS Objects
- Materials
- Permits
- Product

Inputs

- Characterize
- Purchases
- Usage



Outputs

Product

- Product

Non-product

- Air
- Wastewater
- Waste

Reminders

- Reminders

Reports

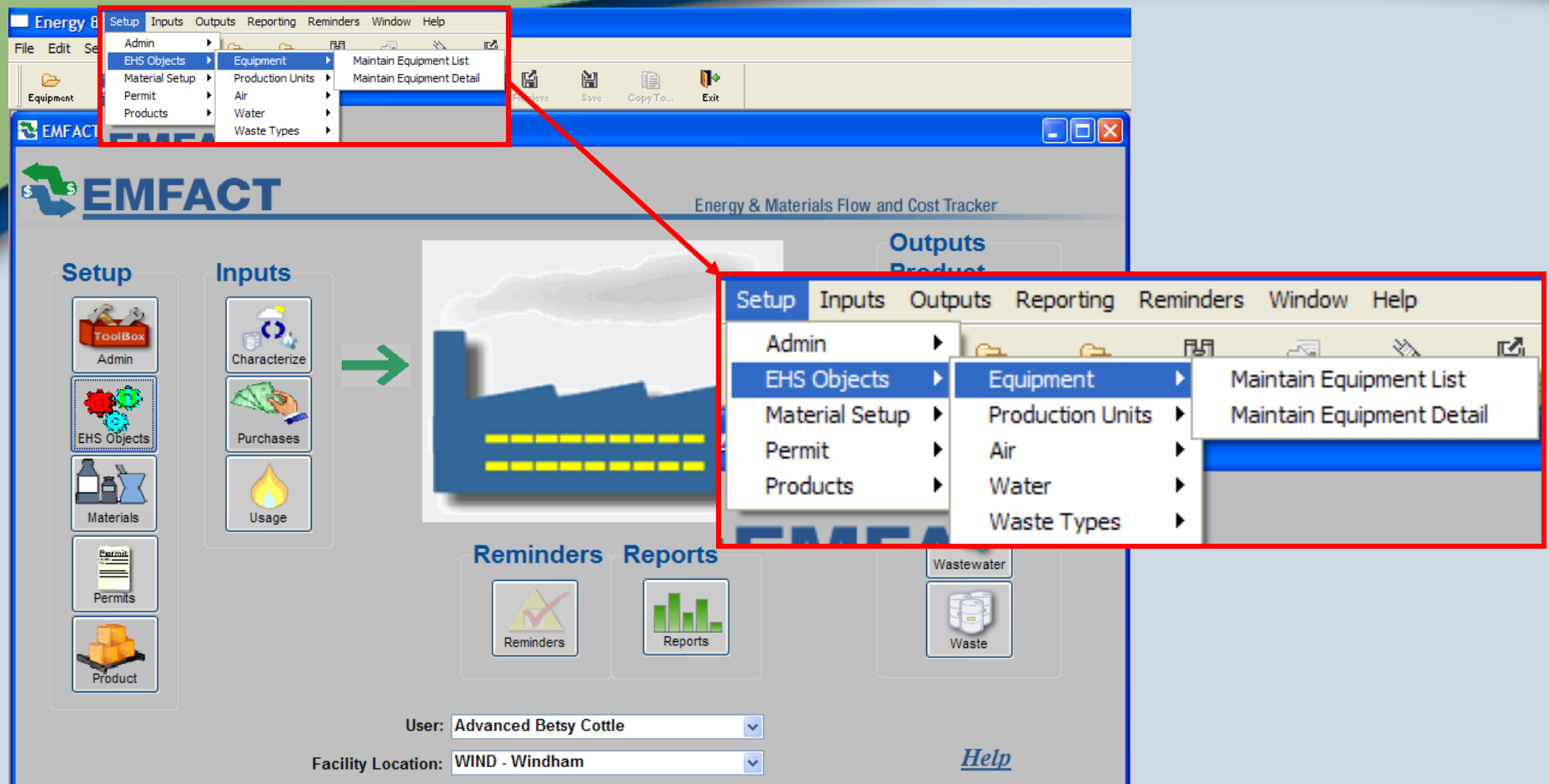
- Reports

User:

Facility Location:

[Help](#)

EMFACT Navigation



Menu paths are provided for all windows.

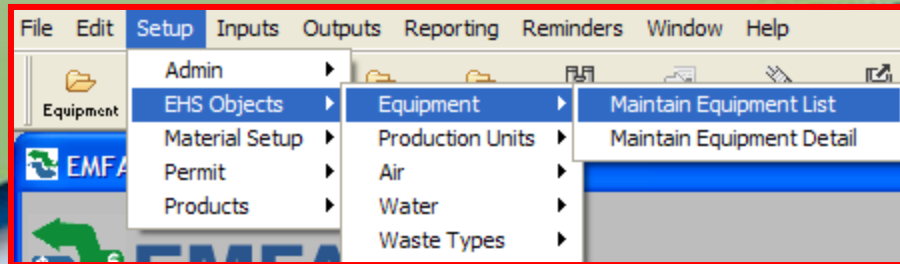
Clicking an icon, button, or menu path will open a new window for the indicated functionality.

EMFACT Example

Air Emissions from a Paint Booth



Define Process Equipment



Add Paint Booth to the Equipment List - then add details.

The 'Maintain Equipment List' window displays a table of equipment. The table has columns for Equipment ID, Description, Building, Building Name, Location, Installation Date, and Category. Two rows are visible: 'BOOTH #4' (Paint Spray Booth #4) and 'BOILER 1' (Boiler in NW cost).

Equipment ID	Description	Building	Building Name	Location	Installation Date	Category
BOOTH #4	Paint Spray Booth #4	100	Main Building	East corner	10/15/2000	Paint Spray Booth
BOILER 1	Boiler in NW cost	100	Main Building		00/00/0000	Boilers

The 'Maintain Equipment Detail BOOTH #4' window shows detailed information for the selected equipment. Fields include Equipment ID (BOOTH #4), AKA No., Status (Active), Description (Paint Spray Booth #4), Category (Paint Spray Booth), Building (100), Location (East corner), Dept (OPS), Manufacturer (Derrick), Model (CAP2), Annual Operation Hours (0), Installation Date (10/15/2000), Permit/Reg. No., and File Name.

Equipment ID: BOOTH #4 **AKA No:** **Status:** ☒ Active

Description: Paint Spray Booth #4 **Category:** Paint Spray Booth

Building: 100 **Main Building** **Prod Unit ID:**

Location: East corner

Dept: OPS **Operations** **Update Date:** 10/16/2007

Manufacturer: Derrick **Installation Date:** 10/15/2000

Model: CAP2 **Permit/Reg. No:**

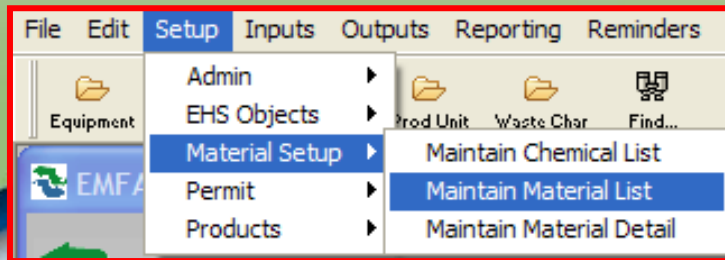
Annual Operation Hours: 0

File Name:

☐ Enable Advanced Fields

STS/SIM813

Define Input Materials



Add
paint to
the Input
Materials
List -
then add
details.

Maintain Materials List

Find Material ID:

Filter Data

Material ID: Synonym: VOC Percent:

Material Category: Manufacturer:

Material Name: CAS:

Material ID	Material Name	Material Type	Status	Manufacturer Name	Mfr Written Date
GAS	Natural Gas	Fuel	Active		
SPECIAL PAINT	Paint specific to Booths	Paint	Active	Paintco	10/2/2006

Maintain Material DetailSPECIAL PAINT

Material ID: SPECIAL PAINT Written Date: 10/2/2006 00 Revision Date: Status: Active ☒

Material Type: Paint

Chemical Name: Paint specific to Booths

Trade Name: Paint 123A Grey

Mfr Name: Paintco

Hazardous Warnings:

Density: 7.9000 VOC Percent: .00 Target Organs:

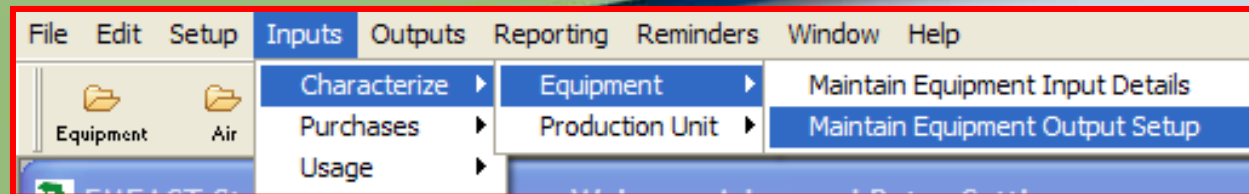
Last Update: 10/16/2007

Comments:

Constituent | Synonyms | Container

Chemical ID	From %	To %	Avg %	Chemical Name:	Last Update
10099-76	10	20	15	Lead Silicate	10/16/2007
1344-37-2	5	10	7.5	Chrome Yellow	10/16/2007

Define Non-product Outputs



Maintain Equipment Output Setup for: BOOTH #4

Equipment Id: BOOTH #4 **Description:** Paint Spray Booth #4

Building: 100 Main Building

Location: East corner **Updated:** 10/16/2007 **More ...**

Source **Fuel Burn** **Paint** **Emissions** **Water**

Source Type: ☐ Fuelburn ☒ Paint/Spray Booth ☐ Other Material

VOC Control Efficiency %: 80.00

TSP Control Efficiency %: 95.00

Default Units: Gallons

Source **Fuel Burn** **Paint** **Emissions** **Water**

Paint: Paint specific to Booths **Density:** **Active?** ☒

Pollutant: TSP **Pollutant Content:** 1 **VOC Percent:**

Comments:

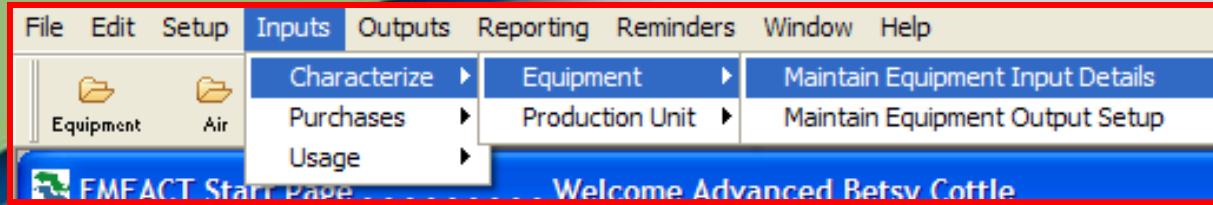
Paint: Paint specific to Booths **Density:** 7.9 **Active?** ☒

Pollutant: VOC **Pollutant Content:** 5 **VOC Percent:** 0

Comments:

In the case of air emissions, determine emission factors for different pollutants.

Link Equipment, Inputs, & Outputs



Link the Paint Input Material to the Paint Booth Equipment.

Maintain Equipment Input Details for: BOOTH #4

Equipment Id: BOOTH #4 **Description:** Paint Spray Booth #4

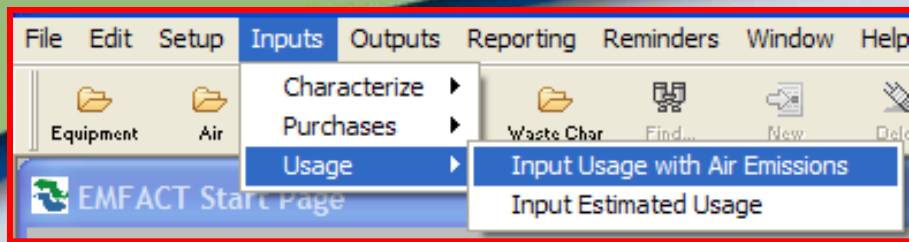
Building: 100 Main Building

Location: East corner **Updated:** 10/16/2007

Materials Air Source Discharge Waste Products

Material ID	Material Name	Material Type	Manufacturer Name	Active?
SPECIAL PAINT	Paint specific to Booths	PAINT	Paintco	<input checked="" type="checkbox"/>

Inputs – Enter Usage Data



Enter paint
usage data.

Input Usage with Air Emissions

Equipment Id: BOOTH #4 Source Type:

Material Id: SPECIAL PAINT Material Description: Usage Date: 10/17/2007 07:00 Run Time (in Hours): 5.00 Usage Qty/Units: 20.00

Save Usage! Gallons

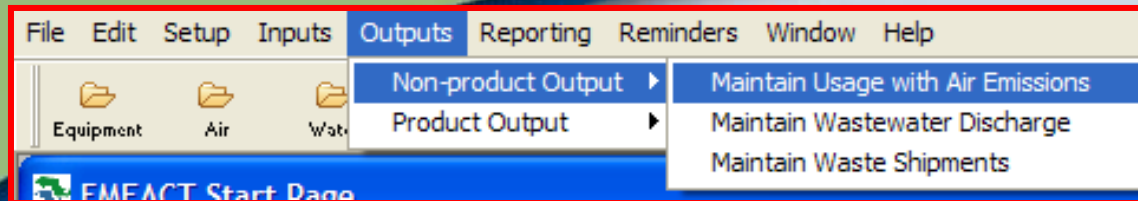
Entry Data so far...

<u>Equipment Id</u>	<u>Material Id</u>	<u>Usage Date</u>	<u>Run Time (in Hours)</u>	<u>Usage Qty/Units</u>	
BOOTH #4	SPECIAL PAINT	10/16/2007 08:00	4.50	10.00	Gal

Update/View Emissions

Data per Source Daily Recordkeeping Monthly Recordkeeping STS200

Outputs – Auto Calculated *(in this case)*



Emissions are automatically calculated in this case. Outputs will be manually entered in other cases, e.g., solid waste.

Maintain Usage with Air Emissions for Windham

Filter Data:

Equipment Id: BOOTH #4 Usage Date From: 00/00/0000
Production Unit Id: Usage Date To: 00/00/0000
Clear Filters

Equipment Id: BOOTH #4 Source Type: Paint

Material Id: SPECIAL PAINT Material Description:

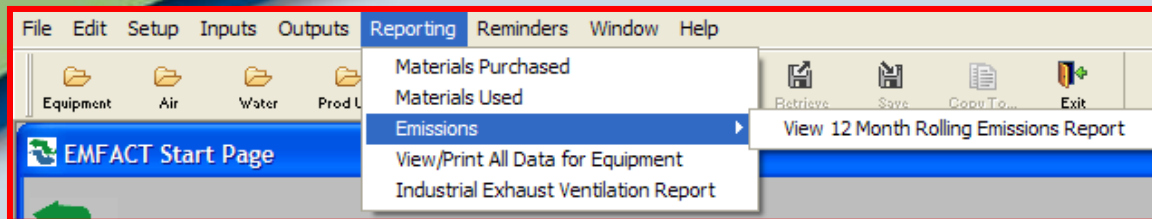
Usage Date	Run Time (in Hours)	Usage Qty/Units
10/17/2007 07:00	5.00	20.00 Gallons

Pollutant	Emission (Lbs.)	Start Date/Time
TSP	1.03	10/17/2007 07:00
VOC	19.91	10/17/2007 07:00

Updated: 10/16/2007

Report

Review paint usage with computed emissions by month & 12-month rolling totals.



Paint Manager - 12 Month Emissions Summary Report

Filter Data

Production Unit/Equipment ID: BOILER 1 From Usage Date: 01-2007 To Usage Date: 10-2007 (MM-YYYY) Clear Filter

10/16/2007 18:17:16 12 Month Emissions Summary Recordkeeping Page 1 of 1
From 01-2007 To 10-2007

Site: Windham

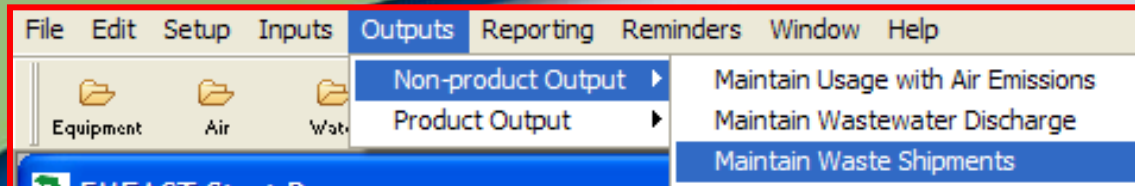
BOOTH #4 Paint Spray Booth #4

Usage Month	Current Month Totals				12 Month Running Totals			
	Hours	Usage	Pollutant	Total Emissions	Hours	Usage	Pollutant	Total Emissions
10-2007	4.50	79.0000	TSP	0.5135	0	79	TSP	0.5135
			VOC	9.9540			VOC	9.9540
<hr/>								
Grand Total:	4.50	79.0000	TSP	0.5135				
			VOC	9.9540				

Cost Data

- EMFACT will also allow **collection of relevant cost data**; this feature is in an early stage of development.
- **Examples** include:
 - ♦ Materials purchase costs
 - ♦ Waste management & disposal costs
 - ♦ Others

Waste Shipments & Costs



The Waste Shipment screen allocates back to the source, tracks cost data, & tracks other waste shipment information (date, manifest, vendor, etc.).

Maintain Shipment No.: 0000001

Shipment No.: 0000001 Shipment Date: 10/04/2007 Last Update: 10/16/2007

Contact Person: Liz Ostwald

Vendor Name: New Waste Vendor

State Manifest

Manifest No.: CT1234 Document No.: Returned?: ☐ # of Days Outstanding: 11

Total Weight in Lbs.: 377 Total Shipment Cost \$: 24,352.00

Waste

Waste Type	Weight in Lbs.	Internal Cost in \$	External Cost in \$	Total Cost in \$:
Cardboard	22	0.00	0.00	0.00
Equipment/Production Unit ID: 1234 Machine 2				Last Update: 10/15/2007
Oil	22	444.00	121.00	565.00
Equipment/Production Unit ID:				Last Update: 10/04/2007
Scrap	333	555.00	23,232.00	23,787.00
Equipment/Production Unit ID:				Last Update: 10/04/2007

Compliance Information

- A survey of potential users told us – **regulatory compliance must be a component** of EMFACT
- So, EMFACT **incorporates lists of regulated chemicals**; tool can flag & report on these chemicals:
 - ♦ SARA 313
 - ♦ Hazardous Air Pollutants (HAPs) – federal & state
 - ♦ Ozone Depleting Substances – Classes I & II
- EMFACT also provides
 - ♦ Ability for users to **create their own chemical lists**
 - ♦ Screens to list/describe **permits**
 - ♦ A **calendar with event reminders** (e.g., permit renewal)

Examples of Reminders

Search For Events

Filter Data

Find Event No.

Event Name:

Location:

Event Status: Open

Due Date: > 00/00/0000

Reminder Date: > 00/00/0000


Recurring? No

Dept.:

Due Date	Event No.	Site Code	Event Name	Event Location	Reminder Start	Event Status	C
8/13/2007	0000001	WIND	Permit Expiration for: 2007-01			Open	001
09/13/2007	0000002	WIND	Permit Expiration for: 2007-01			Open	001
07/20/2008	0000003	MYC	Permit Expiration for: 2007-011			Open	001
06/20/2008	0000004	MYC	Permit Renewal Due for: 2007-011			Open	001
05/20/2008	0000005	MYC	Permit Renewal Start for: 2007-011			Open	001
12/01/2007	0000006	WIND	Permit Expiration for: ABC123			Open	002

☐ Enable Advanced Fields ☐ Display All Sites 1 of 6 Records PAC010

Reminder Details



Event No.: 0000004 Site Code: MYC Due Date: 06/20/2008 Status: Open

Permit Renewal Due for: 2007-011 Location:

Desc:

Contact Person: 001 Liz Ostwald Last Update: 07/20/2007

Event Filename: GO

Email Reminder

Initial Reminder Date: Final Reminder Date:

Responsible Department: 0

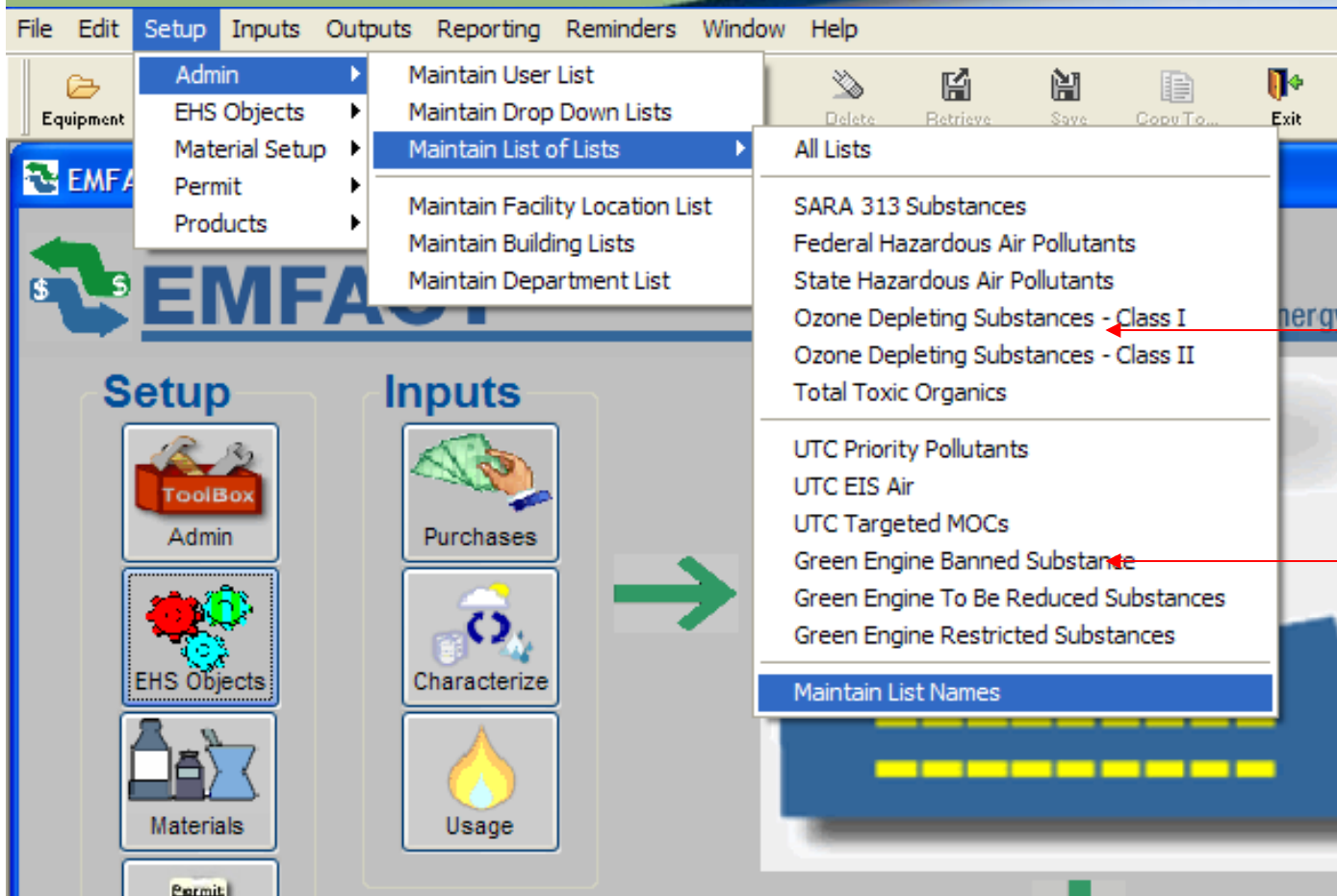
Recurring Event

Recurring? ☐ Yes ☒ No Frequency: # of Occurrences: Event No.: Create Recurring Events

Recurring

Event No.	Event Name	Final Reminder Due Date	Status
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Lists of Regulated Chemicals



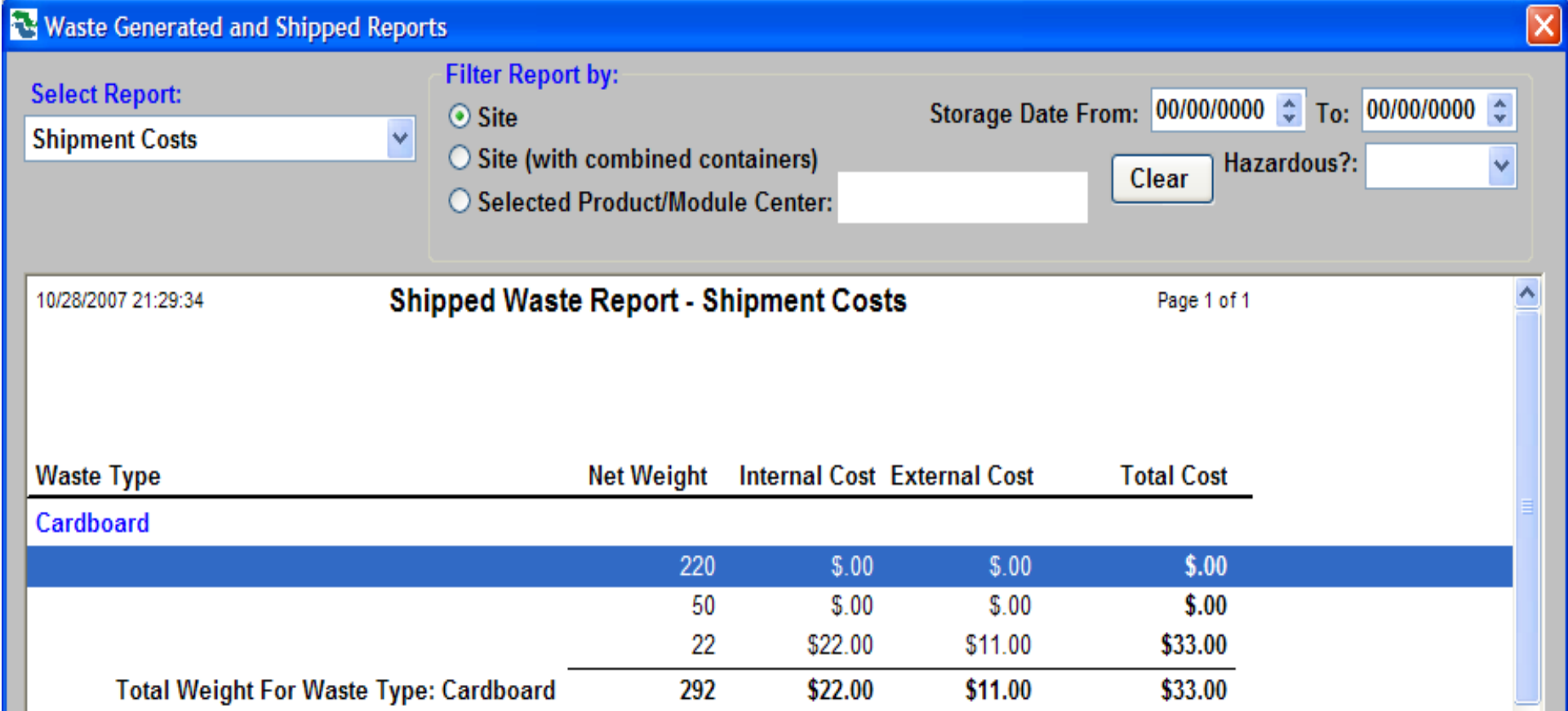
Preloaded
lists

User-defined
lists

What Kinds of Reports?

- Lists of equipment & of materials/chemicals
- Materials Use &/or Non-Product Output *per unit of product, per equipment, per production unit, for entire facility*
- Materials Use - *incorporated into product vs. into non-product output*
- Various cost reports
- SEARCH window will enable searching by a variety of fields - output can be printed or saved to Excel

Example–Solid Waste

A screenshot of a software window titled "Waste Generated and Shipped Reports". The window has a blue title bar with a close button. Inside, there's a "Select Report:" dropdown menu set to "Shipment Costs". To the right, under "Filter Report by:", there are three radio buttons: "Site" (selected), "Site (with combined containers)", and "Selected Product/Module Center:". Further right, there are date pickers for "Storage Date From:" and "To:", both set to "00/00/0000", and a "Clear" button. Below these is a "Hazardous?:" dropdown menu. The main content area shows a report titled "Shipped Waste Report - Shipment Costs" with a timestamp "10/28/2007 21:29:34" and "Page 1 of 1". The report is a table with columns: "Waste Type", "Net Weight", "Internal Cost", "External Cost", and "Total Cost". The data is for "Cardboard" and includes a total row.

Waste Generated and Shipped Reports

Select Report:
Shipment Costs

Filter Report by:
☒ Site
☐ Site (with combined containers)
☐ Selected Product/Module Center:

Storage Date From: 00/00/0000 To: 00/00/0000
Clear Hazardous?:

10/28/2007 21:29:34 Shipped Waste Report - Shipment Costs Page 1 of 1

Waste Type	Net Weight	Internal Cost	External Cost	Total Cost
Cardboard	220	\$.00	\$.00	\$.00
	50	\$.00	\$.00	\$.00
	22	\$22.00	\$11.00	\$33.00
Total Weight For Waste Type: Cardboard	292	\$22.00	\$11.00	\$33.00

Example–Solid Waste

Waste Generated and Shipped Reports

Select Report:
Chargeback Costs



Filter Report by:
☒ Site
☐ Site (with combined containers)
☐ Selected Product/Module Center:

Storage Date From: 00/00/0000 To: 00/00/0000
Clear Hazardous?:


10/28/2007 21:28:52 Shipped Waste Report - Chargeback Costs Page 1 of 1


Waste Type	Shipped Net Weight	Chargeback Rate	Extended Cost
Cardboard	220	3.25	\$715.00
	50	3.25	\$162.50
	22	3.25	\$71.50
Total Weight For Waste Type: Cardboard	292		\$949.00
Oil	100	120	\$12,000.00
	2,200	120	\$264,000.00
Total Weight For Waste Type: Oil	2,300		\$276,000.00

Example—Chemical Usage

 Chemical Usage Report 


Find CAS No.:

From Date: 09-2007 

To Date: 10-2007 

Scope

☐ All detail ☐ CAS Summary ☒ CAS / Material Summary

10/28/2007 **Chemical Usage Report From 09-2007 To 10-2007** Page 1 of 2 

Note: All usage is in Lbs.

Chemical	Material	Chemical Usage Dept	Usage Date
10099-76-0	Lead Silicate		
	SPECIAL PAINT	Paint specific to Booths	
		Total for Paint specific to Booths:	35.55
		Total for Lead Silicate:	35.55
11120-22-2	Lead Silicate		
	GLIDDEN1	Glidden Eggshell Paint	
		Total for Glidden Eggshell Paint:	708.2795
		Total for Lead Silicate:	708.2795

User Flexibility

- Two user levels: basic & advanced
- Can have multiple users
- Can start small or big - for a single process or product line, or for the entire facility
- Can do grouping
 - ♦ Group individual pieces of equipment into "production units"
 - ♦ Group similar pieces of equipment into equipment "categories", e.g., paint booths

EMFACT Help Features

Cue Cards for EHS Object Setup

EQUIPMENT AND PRODUCTION UNIT QUESTIONS

EMFACT data can be tracked to the specific process equipment level or to a higher level group of process equipment called a "production unit" or to both levels.

Do you want to:

1. Add process equipment to the list or edit data for an existing process equipment?
2. Add production units to the list or edit data for an existing production unit?

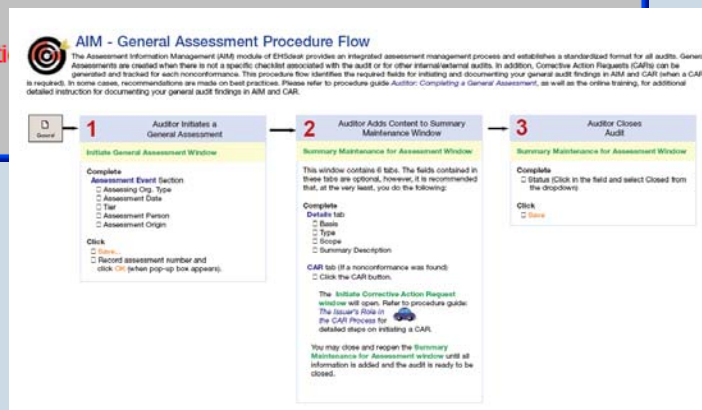
AIR / WATER / WASTE INVENTORY QUESTIONS

Do you want to:

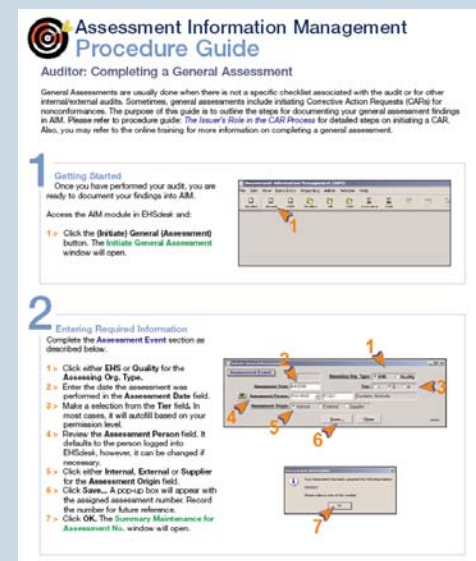
3. Add air emissions source (e.g. stacks) to the list or edit data for an existing air emission source?
4. Add water discharge points to the list or edit data for an existing water discharge point?
5. Add waste types used to categorize waste shipments to the list or edit data for an existing waste type?

Previous Question **Close** **To skip to a question**

"Cue-card" type menus will be provided for the basic user to guide them through a logical series of windows.



Other user documentation will include process flows & procedure guides.



EMFACT Development Status

- Development will continue for another 2-4 weeks
- Early (team) testing is ongoing
- Formal testing start target is November – includes pilot training at facilities
- Launch v1 in March 2008
(downloadable for free!)

For More Info...

<http://www.newmoa.org/prevention/emfact>

→ Terri Goldberg (NEWMOA):

tgoldberg@newmoa.org

→ Rick Reibstein (MASS OTA):

rick.reibstein@state.ma.us